

## **Observation and modelling of the OH, HO<sub>2</sub> and RO<sub>2</sub> radicals at a rural site (Wangdu) in the North China Plain in summer 2014**

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A comprehensive field campaign was carried out in summer 2014 in Wangdu located in the North China Plain. A month of continuous OH, HO<sub>2</sub> and RO<sub>2</sub> measurements were obtained by a laser induced fluorescence system. High daytime OH, HO<sub>2</sub> and RO<sub>2</sub> radical concentrations were observed of which their daily maximum concentrations were  $(5 - 15) \times 10^6 \text{ cm}^{-3}$ ,  $(3 - 14) \times 10^8 \text{ cm}^{-3}$  and  $(3 - 15) \times 10^8 \text{ cm}^{-3}$ , respectively. A chemical box model constrained by observed trace gas compounds with state of art chemical mechanism is used to interpret the observed radical concentrations. The model underestimated the observed OH concentrations by a factor of 2 when NO is less than 100ppt in the afternoon hours. Like PRIDE-PRD2006 and CAREBEIJING2006, an additional OH recycling is required to reproduce the observed OH concentrations for the high VOC and low NO<sub>x</sub> conditions. Based on a few chemical modulation experiments we performed at the site, the determined OH interference signal were very small for the afternoon conditions. In addition, we found that observed RO<sub>2</sub> concentrations were underestimated in the morning hours which indicated the existence of additional chemical sources of RO<sub>2</sub> and an underestimation of the local ozone production rates in current model.